IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

SANDPOINT HATCHERY

1992

Prepared by:

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The Sandpoint Hatchery is located in Bonner County on the south shoreline of the Pend Oreille River approximately two miles south of the town of Sandpoint. Sandpoint Hatchery was closed in 1985 due to high fish production cost, but was reopened in 1990 because of public demand. The primary duty of the hatchery is public relations with local sportsmens' groups Trout Unlimited and Lake Pend Oreille Idaho Club and "walk-in" tourists. Other duties include managing a small-scale specialty station and operating or assisting in regional egg-taking programs.

The hatchery is primarily license funded, with an annual operating budget of $18,000. Additional funds include $3,000 by Bonneville Power Administration (BPA) to raise sturgeon, $1,700 by Washington Water Power (WWP) for net pens, $3,270 by Trout Unlimited for net pen fish feed, and $350 from Lake Pend Oreille Idaho Club for net pens.

The hatchery is staffed with one Hatchery Superintendent I and a non-benefitted 8-month laborer position.

Water Supply

The hatchery rearing water consists of 500 to 600 gallons per minute (gpm) at a temperature of 7°C from Murphy Spring #3. Springs #1, #2, and #4 have not been developed for hatchery use, although their discharge is included in the 4 cfs water right. The hatchery flow fluctuates seasonally, with lowest flows in late summer and highest flows in early spring.

The Idaho Department of Fish and Game (IDFG) was deeded the springs in 1928; however, this deed didn't include property ownership of the surrounding land. An easement agreement was made which states that IDFG will provide a 2-inch domestic line to the land owners in exchange for the right to construct a collection reservoir and pipeline right-of-ways from the springs to the hatchery.

The water right to Spring #2 has been waived to the South Side Sewer District in the amount of 300 gpm. This water can be reclaimed for hatchery use if needed.

Rearing Facilities

The hatchery rearing facilities include 8 Heath incubators (8-tray), 18 cement vats (13 ft x 2.5 ft x 3 ft), and 2 reuse raceways (100 ft x 5 ft x 2 ft). Other hatchery rearing facilities include seven net pen frames and nine net pens (20 ft x 20 ft x 20 ft) with assorted mesh sizes ranging from 1/4 inch to 1 inch. The buildings consist of one nursery/shop/office complex, one storage shed, garage/crew quarters, and a residence.

FISH PRODUCTION

The Sandpoint Hatchery produced 9,078 pounds of fish from 18,219 pounds of feed (2.0 conversion) with costs of production estimated at $6.22 per pound and $63.20 per thousand fish or eggs (Table 1). This summary includes the costs of producing a captive kokanee salmon broodstock without the benefits of pounds produced and an increase in overall conversion. Five species of salmonids

(rainbow trout, cutthroat trout, bull trout, kokanee salmon, chinook salmon) and one species of Acipenser (white sturgeon) were produced in 1992 for statewide distribution.

The Gloyd Spring Kamloop and Henrys Lake hybrid lots were closed out this year resulting in 65% and 71% survival, respectively, from eggs received. The bull trout lot was closed out in 1992 and resulted in 69% survival from green eggs. They converted feed at 1.26. The 1991 Kootenai sturgeon survived, from sac fry to catchable, at a 13.8% rate and converted feed at 2.0. In contrast, only 8.4% of the 1992 sturgeon have survived to December 31, 1992.

The hatchery started the 1992 production year with 589,000 fish weighing 4,914 pounds (Table 2). A total of 572,872 (2,247 pounds) fish and eggs were received, with an additional 76,000 eggs spawned during the production year (Table 3). The Sandpoint Hatchery ended the year with 433,970 fish weighing 4.082 pounds (Table 4).

HATCHERY IMPROVEMENTS

The BPA funded hatchery improvements to raise white sturgeon, which paid for an additional recirculating water heating system. This money was provided in support of the Kootenai River sturgeon project.

The net pen project on Lake Pend Oreille was improved by WWP (the purchase of two net pens and two belt feeders) and Lake Pend Oreille Idaho Club (a new floating frame). Continual capital outlay replacement is necessary to maintain this project at its current level.

Hatchery improvements funded by license dollars included a temporary hatchery sign, **a** refrigerator, hatching trays, oxygen and temperature meter, and a cutting torch.

The most significant need for hatchery operations is **a** new 4 x 4 pick-up truck. This item was funded in the 1991 budget, but was not purchased due to statewide budgetary cuts. A newer used (100,000+ miles) pick-up truck was transferred, but will not meet the long-term demands of this facility. Other items needed include office furniture, hatching trays, Lotus 1-2-3 computer program, and an upgrade temporary position to bio-aide.

FISH HEALTH

The IDFG personnel from Eagle Fish Health Laboratory conducted health inspections on production fish and broodstock. The overall health of hatchery fish was good. The white sturgeon iridovirus was found in Kootenai Hatchery-reared fish that were transferred to the Sandpoint Hatchery. Nearly 50% of the fish had died before we were instructed to destroy the fish from Kootenai Hatchery. To date (still pending), this virus has not been detected in sturgeon hatched and reared on-station.

The Washoe, Montana westslope cutthroats (91-Mon-C2) were transferred to Nampa Hatchery after sorting out deformed fish with short opercles, blunt noses, and bug eyes.

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FISH STOCKED AND TRANSFERRED

A total of 467,142 fish (12,701 pounds) were stocked or transferred by the hatchery staff (Table 5). The cutthroat trout reared in net pens provided the majority of pounds stocked (5,560) in Lake Pend Oreille. Other stocking included 2,540 (67 lbs) rainbow-cutthroat hybrids (RC) into Jewel Lake, 1,010 (51 lbs) rainbow-cutthroat hybrids into Lower Twin, 23,250 (645 lbs) bull trout into the Snake River, and 5,990 (500 lbs) bull trout into Lucky Peak Reservoir. The domestic Kamloop transferred (Nampa and Cabinet Gorge) provided the majority of the numbers (335,205). The balance consists of transfers of 4,450 (81 lbs) rainbow, 6,000 (400 lbs) cutthroat, and 13,230 (2,225 lbs) kokanee to Cabinet Gorge Hatchery; 3,080 (195 lbs) cutthroat to Clark Fork Hatchery; 6,765 (191 lbs) to Nampa Hatchery, and 2,000 (159 lbs) to Washington; 492 (102 lbs) sturgeon to Kootenai; and 13,000 chinook eggs to Mackay Hatchery.

FISH SPAWNING

Chinook

The fall chinook traps were installed August 14 in the Coeur d'Alene River and September 4 in Wolf Lodge Creek. A few chinook ran up Wolf Lodge Creek prior to installing the weir. Criteria for broodstock selection included:

1. Size - females over 18 pounds

2. Timing - fish entering the trap prior to October 1

3. Pairs - a minimum of 25

Fish spawned September 15, 18, and 22, 1992 from 59 fish (32 females and 27 males) were used for the 1992 broodstock. Eggs were fertilized using a 1:1 ratio and incubated in lots of two females per tray on September 18 and September 22. Eggs collected September 15 were fertilized using all males with their milt pooled.

A total of 181 fish were trapped on Wolf Lodge Creek, with 112 fish from hatchery releases. A three-year mean of hatchery returns was estimated at 0.26%; however, this doesn't include fish checked by management biologists (Table 6). Only two fish were checked by hatchery personnel on the Coeur d'Alene River.

An estimated 375,000 green eggs could have been taken, as fecundity was estimated at 4,300 (n=3) with 88 females trapped. Eye-up survival was good, 70%, which resulted in plenty of eggs to meet the egg request of 13,000. The remaining eggs were destroyed.

FISH FEED

The primary source for feed is Bioproducts, Inc. in Warrenton, Oregon. Biodry 4000 appears to be the best suitable diet for westslope cutthroat trout (Thorpe, IDFG, personal communication). Since the majority of the hatchery production comes from net-penned cutthroat, most of the feed is ordered from Bioproducts to reduce shipping costs. This company delivers feed to north Idaho and western Montana every three months.

Biokyowa was used to start the white sturgeon on feed. After feed training, the fish were switched to Rangen soft-moist for grow-out.

Feed cost at the Sandpoint Hatchery was $2,371.83 from license funding. The majority of the feed used was purchased by Trout Unlimited ($3,272.30). Excess feed from Cabinet Gorge Hatchery is still a non-quantified funding source of feed used by the Sandpoint Hatchery.

PUBLIC RELATIONS

About 3,000 people toured the Sandpoint Hatchery in 1992. Tourists included the general public and various forestry, fish, school, and scout groups. Most tourists left with an excellent opinion of IDFG. Excellent relations were maintained with Trout Unlimited and Lake Pend Oreille Idaho Club, even though the managers time has been divided between school (pursuing a M.S. degree) and work. The manager manned a display booth for the Trout Unlimited spring banquet and received an award for outstanding cooperation. He also gave multiple presentations to Lake Pend Oreille Idaho Club monthly meetings. Both groups are enthusiastic about helping the resources, and would do more if given the opportunity.

An educational project was developed with Sagle School. The basis of the project is for grade school students to learn the life history of kokanee. It starts with kids viewing or assisting in spawning kokanee at the hatchery, watching eggs (1,000) develop, hatch, and swim-up in a school aquarium (cost $1,000), releasing fry in Garfield Bay Creek, and ending with returning adults four years later. This project will make kids aware of their natural resource.

SPECIAL PROJECTS

Bull Trout

The development of bull trout culture was a primary goal of the Sandpoint Hatchery. This goal has been achieved with little changes, if any, to existing techniques used in salmonid culture. Bull trout spawntaking, rearing, and stocking in the Pend Oreille system will be discontinued. These fish will be managed as wild stocks. However, the techniques that were developed regarding spawning, incubation, rearing, and liberation are discussed.

Spawning

The collection of ripe adults is the priority. The quality of gametes, males and females, is affected by holding time and associated stresses of captivity. Stress and overripe fish can result in poor or no reproductive success. For example, no reproductive success was observed in Clark Fork River fish collected in mid-September 1989 and spawned in early October with Gold Creek males. This cross should have resulted in viable eggs, since the results of experimental crosses in 1990 produced fish.

There is little or no evidence to suggest a Dolly Varden population exists in Gold Creek or Clark Fork River from introductions into the system from the Clark Fork facility.

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For successful spawning, it is suggested that fish not be held more than three days prior to spawning, and adult collection coincide with natural spawn timing. The Clark Fork River fish spawning activity peaks in late September and early October. Egg survival to eye-up from fish spawning September 27 to October 3, 1990 was 92%, and fish after that was 31%. The Gold Creek fish spawning activity appears to have a larger "window," as fish spawned September 27 and October 15 had excellent survivals, over 90%.

Incubation

Eggs were fertilized at the Sandpoint Hatchery using a delayed fertilization technique. Milt and eggs (with ovarian fluid) were collected from anesthetized (MS-222) adults, and their subsequent eggs and milt transported on ice in zip-lock bags. Eggs and milt were stored for about 6 hours before fertilization occurred. Eggs collected were water-hardened in 100 ppm argentyne with little noticeable affects on survival.

Incubation temperatures at 7°C resulted in an acceptable overall survival of 85% to eyed egg; however, this survival would have been over 90% if eggs from two overripe females spawned on the Clark Fork River in mid-October were included in the total take (Table 7).

Rearing

Nearly button-up alevins were placed in vats with flows of 12 gpm. Fish were started on Biodiet starter #2. Bull trout fry do not swim-up toward the surface and feed; rather, they roll-over and wait for feed to come to them. It was necessary to stop surface flow to allow feed to sink. Surface flow was stopped by wedging a board between the vat walls. This board effectively stopped feed from floating out of the vat and forced the feed to sink. Feed sizes were changed following the manufacturer's recommendations. Bull trout were observed feeding off the bottom of the tank.

Fish were reared at high densities, up to a density index of 1.2, although lower densities may facilitate growth. For example, the Gold Creek group of fish were raised at lower densities and grew faster, although that may be a strain characteristic. Flow was maintained based on Pipers Index table. A rudimentary oxygen consumption test was performed at the University of Idaho using 10.4°C water and 6.2 g fish. Bull trout utilized oxygen at 1.59 mg O_2/hr/g, which is comparable to rainbow trout utilization of 1.6 mg 0_2/hr/g. This suggests flow indices guidelines are appropriate for bull trout, providing flow is uniform throughout the water column.

Growth rates of bull trout were compared at three mean temperatures and three facilities: Sandpoint (7°C), Cabinet Gorge (11°C), and University of Idaho (19°C). Fish reared at Sandpoint grew 0.3 + 0.1 mm per day (0.012 + .004), University of Idaho fish grew at 0.25 + 0.08 mm per day (0.01 + .003), and Cabinet Gorge fish grew 0.58 + 0.05 mm per day (0.02 + .002). The University of Idaho water temperatures spiked to 21°C during one growth period. During this period, hemorrhages were observed at the base of pectoral fins causing loss of appetite, slow growth, and death. It also appeared fish became more aggressive, although this was not quantified. When temperatures dropped to 17°C, fish resumed normal growth. These results should not be construed as absolute values, but viewed as relative guidelines. Maximum growth could be achieved at 12°C to 13°C if the results of this comparison hold true.

The possibilities for successful bull trout culture looked bleak a few years ago. We have demonstrated that they can be cultured and can survive to release at about 70% (Table 7) providing we accommodate their requirements.

Liberations

Three cohorts of bull trout have been released into the Clark Fork River at the Cabinet Gorge ladder. Each cohort is marked with an identifiable fin clip. The first group released in the fall 1989 (1988 cohort) is marked with an adipose clip, the 1989 cohort a left ventral fin clip (fall release), and the 1990 cohort a right ventral fin clip (spring release). These releases should be followed up with adult collections at the Cabinet Gorge ladder starting in the fall of 1994. Results should include age and size of first maturity, percent returns, and verification of aging techniques.

Kokanee Broodstock

The development of kokanee broodstock techniques has become a responsibility for the Sandpoint Hatchery. Due to space, the majority of the 7,000 fish that were to be held until maturity have been transferred to Cabinet Gorge (Table 5). However, 491 fish remained on station.

A total of 332 (68%) kokanee matured as 2+ fish (2 year old, AFS aging) and 159 remained immature fish. From these mature fish, 251 (76%) fish were males and 81 (24%) females. A 10-fish sample was taken from the 159 immature fish to determine a sex ratio. From this sample, 3 fish were males and 7 fish were females. Assuming this 10-fish sample is representative of the 159 immature fish, it would suggest this group of fish is skewed towards males (61 ± 5%).

From the 81 females, 76,000 eggs were collected for an average fecundity of 940 eggs per females. These eggs produced are small (18 eggs/g) compared to Coeur d'Alene (16 eggs/g) and Pend Oreille (14 eggs/g) kokanee, even though these fish are larger. The overall egg quality is average. Although the early takes had good quality eggs, the plugging of the oviduct was a problem in later spawning fish, lowering their egg quality. Fish with this condition (if detectable) should be incised for egg collections.

The size of mature, male and female, fish was larger than the immature fish. The female fish averaged 12.5 inches (range 9.5-15 inches) and the males 13.5 inches (range 9.5-16 inches). The immature fish were smaller at 11.5 inches and a range of 8.7-14 inches. This is somewhat unusual. Typically, the fastest growing fish mature earlier than their slower growing siblings, but generally, maturation processes slow growth enough that the immature fish become larger by spawning time. This did not happen. It is probable that growth rates can be maintained in these maturing fish producing more eggs if they are fed to satiation.

The spawn timing of these fish may be delayed, as egg taking was extended through February. Although these fish originated from the late spawning adults in 1989, this delay is unusual, as the Pend Oreille stock is typically finished spawning by the first of January. The use of the hatchery's night light may have caused this problem "clouding" the photoperiod cues.

Sturgeon

Sturgeon were experimentally incubated at the Sandpoint Hatchery using the recirculating heating system. About 9,500 fertilized and de-adhesived eggs were received from the Kootenai Hatchery six hours after spawning on June 18. Eggs were incubated in upwelling McDonald jars at 17°C to 18°C water and monitored for development. Thirty-one hours after fertilization, 92% of the eggs had developed to the late cleavage stage. Drop-out continued through neurulation, with 60% surviving 94 hours later (complete neurulation) with fungus the major source of mortality. A complete loss of eggs would have occurred if we did not manually break-up egg clumps. Flow was doubled (June 22) after neutralization was observed to help control this problem. Hatching started June 24 and was completed by June 26, resulting in an 18% hatch. Feed training started June 30.

Fish Marking

Two hundred and eight-five net-penned cutthroat were floy-tagged with a five-dollar reward. About 50 fish from each pen were tagged. All cutthroat reared in net pens are marked with an adipose fin clip prior to loading.

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Table 1. Production summary, Sandpoint Hatchery, 1992.

	Numbers	Weight gain	Total feed fed	Conversion	Production cost	Cost/lb gain	Cost/1,000 fish or egg
Totals	893,921	9,078	18,219	2.00	56,500	6.22	63.20

*Costs are estimated from January 1, 1992 to December 31, 1992 and do not include capital outlay expenditures.

Table 2. Fish at the Sandpoint Hatchery, January 1, 1992.

Species	Stock	Numbers	Weight (lbs)	Length	Fish/lb
Rainbow	91-BC-K2	5,180	30	2.51	172
Rainbow	91-Wa-K1	450,000	11	0.85	4,086
Cutthroat	90-Mon-C2	8,700	348	4.85	25
Cutthroat	91-Mon-C2	14,400	37	1.95	385
Cutthroat*	90-Id-C2	55,000	2,391	5.00	23
Sturgeon	91-Id-St	500	10	4.60	51
RC Hybrids	91-Id-RC	4,090	24	2.52	172
Kokanee	90-Id-KL	7,105	1,323	8.50	5.37
Bull trout	91-IdGC-Bu	14,000	187	3.75	75
Bull trout	91-IdCE-Bu	17,500	179	3.45	98
Totals		589,420	4,914		

*Net pen fish reared at Garfield and Scenic Bays, Lake Pend Oreille.

Table 3. Fish and fish eggs (received or collected) in 1992.

Specied	Stock	Numbers	Weight (lbs1	Length (inches)	Fish/lb	Receiving status	Source
Rainbow	92-Id-R9	272,000	32	na	8,400	eyed eggs	Hayspur
Cutthroat	92-Mon-C2	115,000	12	na	9,600	eyed eggs	Washoe
Cutthroat*	91-Mon-C2	60,000	2,150	4.68	27.9	fingerling	Clark Fork
Sturgeon	92-Id-St	9,500	1	na	12,000	green eggs	Kootenai
Sturgeon	92-Id-St	3,500	1	na	12,000	sac fry	Kootenai
Sturgeon	92-Id-St	872	19	4.99	47	fingerling	Kootenai
Chinook	92-Id-FC	50,000	25	na	2,000	green eggs	Coeur d'Alene
Kokanee**	92-Id-KL	70,000	8	na	8,750	green eggs	Sandpoint
Totals		**580,872**	2,248				

* Net pens.
** Broodstock Granite Creek origin.

Table 4. Fish and eggs at the Sandpoint Hatchery, December 31, 1992.

Species	Stock	Numbers	Current wt (lbs)	Wt gain (lbs)	Length	Fish/ lb	Fish fed	Conversion	Prod. costs	Cost/lb gained	Cost/ 1,000 fish or mg
Rainbow	92-Id-R9	200,000	24	0	0.80	8,170	0	na	0	0	0
Rainbow	91-BC-K2	920	42	40	5.08	22	68	1.69	706	17.65	765.39
Cutthroat*	90-Id-C2	58,000	3.050	900	5.60	19	1,800	2.00	421	0.47	7.25
Cutthroat	92-Mon-C2	90,000	200	173	1.93	400	208	1.2	1,908	11.03	21.20
Sturgeon	92-Id-St	450	30	29	6.90	15	63	2.18	2,825	97.41	6,277.78
RC hybrids	92-Id-RC	4,000	40	39	2.99	106	46	1.19	942	24.15	235.50
Kokanee**	92-Id-KL	76,000	9	0	eggs	na	0	na	7,065	na	92.96
Kokanee	91-Id-KL	4,440	614	na	8.84	4.8	1,275	2.08	na	na	na
Kokanee	90-Id-KL	160	73	na	11.2	2.2	656	2.20	na	na	na
Totals		433,970	4,082	1,181			4,116	3.49	13,867	11.74	31.95

* Actual sites are Garfield and Scenic Bays, Lake Pend Oreille.
** Total costs will be calculated from their last year rearing cost for that cohort; and no weight gain will be included (some eggs were collected in 1993).

Table 5. Fish and eggs transferred or released from the Sandpoint Hatchery, 1992.

Species	Stock	Numbers	Current wt (lbs)	Wt gain (lbs)	Length	Fish/ lb	Fish fed	Conversion	Prod. costs	Cost/lb gained	Cost/ 1,000 fish or eau
Rainbow	90-Wa-K1	136,000	136	130	1.36	1,000	150	1.10	2,713	20.87	19.95
Rainbow	90-Wa-Kl	199,205	2,389	2,384	3.1	83.4	2,620	1.10	10,000	4.19	50.20
Rainbow	91-BC-K2	4,450	81	53	3.7	55.0	63	1.20	706	13.32	158.65
Sturgeon	91-Id-St	61	2	2	5.5	30.0	4	2.00	825	412.50	13,524.59
Sturgeon	91-Id-St	431	100	99	11.0	4.3	248	2.50	2,000	20.20	4,640.37
Cutthroat	90-Mon-C2	3,080	195	62	5.6	15.8	128	2.07	1,908	30.77	619.48
Cutthroat	90-Mon-C2	6,000	400	185	5.7	15.0	383	2.07	1,908	10.31	318.00
Cutthroat	91-Mon-C2	6,765	191	154	4.2	40.0	343	1.23	1,908	12.39	282.04
Cutthroat*	90-Id-C2	50,130	5,560	3,169	6.8	9.01	4,531	1.43	421	0.13	8.40
RC hybrids	91-Id-RC	2,540	67	54	4.2	38.0	57	1.05	942	17.44	370.87
RC hybrids	91-Id-RC	1,010	51	40	5.4	17..8	42	1.05	942	23.55	932.67
Kokanee	90-Id-KL	6,200	1,375	52	9.0	4.50	2,750	2.00	3,530	67.88	569.35
Kokanee	91-Id-KL	7,030	850	575	7.4	8.27	1,190	1.40	3,530	6.14	502.13
Bull trout	90-Id-Bu	23,250	645	470	4.5	36.0	799	1.70	2,825	6.01	121.51
Bull trout	90-Id-Bu	2,000	159	118	6.0	12.5	200	1.70	2,825	23.94	1,412.50
Bull trout	90-Id-Bu	5,990	500	350	6.52	12.0	595	1.70	2,825	8.07	471.62
Chinook	92-Id-FC	13,000							2,825		217.31
Totals		459,951	12,701	7,897			14,103		42,633		

Table 6. Fall chinook return summary, 1987 to present.

Release year	Number released	Mark	Return years 89/90/91/92	Total return	Percent return
1987	59,400	AD	69/59/ 2/ 0	130	.22
1988	44,600	LV	0/25/65/ 5	95	.21
1989	35,000	RV	0/ 0/56/84	130	.37
1990	36,350	AD	0/ 0/ 0/24	24+	
1991	44,000	LV	0/ 0/ 0/ 0		

* 30 fish collected by management in 1991 not included.

Table 7. Bull trout survival data,

	Green eggs	Eyed eggs	Swim-up fry	Release fingerling
Number	64,090	54,500	51,000	46,690
Green egg survival to:		0.85	0.80	0.73
Eyed egg survival to:			0.94	0.86
Swim-up survival to:				0.92

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